

REMARKS

Claims 35, 46, 52 are cancelled; thus, claims 29-33, 36-45, 47-51, and 53-56 are all the claims pending in the application. Claims 29-33 and 35-56 stand rejected on prior art grounds. Claims 29-33, 35-48, 50, and 54-56 stand rejected upon informalities. Applicants respectfully traverse these rejections based on the following discussion.

I. The 35 U.S.C. §112, First Paragraph, Rejection

Claims 29-33, 35-48, and 54-56 stand rejected under 35 U.S.C. §112, first paragraph. On page 3, paragraph 1, of the Office Action, the Examiner asserts that, in regards to claims 30-33, 35-42, 44-48, and 50-54, “[i]t is unclear what Applicant is referring to by all the limitations of which are incorporated herein by reference. Applicants submit that pursuant to new Rule 37 CFR 1.75(b) and *Pfizer Inc. v. Ranbaxy Labs, Ltd.*, 437 F.3d 1284, 1292, 70 U.S.P.Q.2d 1583, 1589-90 (Fed. Cir. 2006), claims 30-33, 35-42, 44-48, and 50-54 incorporate the claim language as specified in the new rule. Specifically, new 37 CFR 1.75(b) states “a dependent claim must contain a reference to a claim previously set forth in the same application, incorporate by reference all the limitations of the previous claim to which such dependent claim refers, and specify a further limitation of the subject matter of the previous claim.”

Furthermore, the Office Action argues that claims 29, 43, 44, 55, and 56 contain subject matter which was not described in the specification in such a way as to enable one skilled in the art to make and/or use the invention (Office Action, pp. 2-3, item 11). More specifically, the Office Action states that claims 29, 43, 44, 55, and 56 recite the

limitations wherein: “said state of a customer comprises a purchase frequency and a monetary value of purchases, and such that said constraints comprise costs of said marketing channels, effectiveness of said marketing channels, and customer preferences for said marketing channels, wherein said determining of said optimal marketing strategy comprises identifying all possible states of customers, and wherein said identifying of said all possible states of customers comprises identifying all relevant attributes of customers, and partitioning said customers into partitions based on identified attributes using a similarity measure based on a historic policy, actual rewards and transition probabilities from one data point to another, said partitions forming new states of said customers”.

In regards to the claimed feature wherein “said state of a customer comprises a purchase frequency and a monetary value of purchases”, Applicants reference paragraph 0028 of Applicants’ disclosure, which provides that

state is identified by a set of variables such as customer profile, purchase frequency, monetary value of purchases and any other quantifiable measure so that a customer at any event or at any decision epoch can be uniquely identified to belong to a state in the space, S, described by the above set of variables. A typical customer's purchase pattern over time defines a trajectory over this space. In context of this invention, state in the reinforcement learning algorithm always refers to state of the arriving customers.

Additionally, Applicants have removed the following limitations from claims 29, 43, 49, 55, and 56: “said constraints comprise costs of said marketing channels, effectiveness of said marketing channels, and customer preferences for said marketing channels”; “partitioning said customers into partitions based on

identified attributes using a similarity measure based on a historic policy, actual rewards and transition probabilities from one data point to another, said partitions forming new states of said customers”; and, “wherein said determining of said optimal marketing strategy comprises identifying all possible states of customers, and wherein said identifying of said all possible states of customers comprises identifying all relevant attributes of customers”. In view of the foregoing, the Examiner is respectfully requested to reconsider and withdraw this rejection.

II. The 35 U.S.C. §112, Second Paragraph, Rejection

Claims 29, 43, 50, and 55-56 stand rejected under 35 U.S.C. §112, second paragraph. More specifically, the Office Action argues that in regards to claims 44 and 50, actions that may or may not be done are indefinite and do not distinguish the claim over the prior art (Office Action, p. 4, item 13). Applicants have amended claims 44 and 50 to define “determining sequences in which selected initiatives are deployed, when more than one initiative is selected”.

Furthermore, on page 4, last paragraph, of the Office Action, the Examiner asserts that it is unclear what applicant is referring to by historic policy, actual rewards and transition probabilities from one data point to another, said partitions forming new states of said customers. Also, it is unclear how pi is applied to determine the historic policy. Applicants reference paragraphs 0098-0103 and 108-110 of Applicants’ disclosure, which provide an in-depth discussion of “Statespace Discretization Through Partitioning”.

Specifically, paragraph 0101 of Applicants' disclosure provides that an arbitrary separating hyperplane is drawn on the data space S' that partition the space into $S'1$ and $S'2$. Now consider the segment, which has large variance across the data points with respect to the estimated value $V(\pi^H)$, where π^H is the historic policy adopted. Based on the historic policy, the actual rewards, the transition probabilities from one data point to another, a model is constructed to compute the value at all the data points. This segment say $S'1$ is further segmented into two sub-partitions using the least square estimation.

Additionally, on page 4, last paragraph, of the Office Action, the Examiner asserts that it is unclear how customer preferences for marketing channels will be determined. Applicants reference paragraph 0052 of Applicants' disclosure, which provides that a Library of Shopper Profile 208 comprises shoppers' demographics (including income, age, gender, geographical location, interest, hobbies), derived measures from purchase history, and from the response to various marketing initiatives. For example, response to coupon offers, advertisements, product news letters, web browsing click stream, surveys, feedback letters, complaints, e-mail communication, record of verbal exchanges over with merchant's representatives along with the channel across which the customer-merchant interaction took place etc. The differential response of customer across different marketing channels represents customer preference for a channel.

In view of the foregoing, the Examiner is respectfully requested to reconsider and withdraw this rejection.

III. The Prior Art Rejections

Claims 29-33, 37-38, 40, 43-45, 47-49, 50-51, and 54-56 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Honarvar, et al. (U.S. Patent No. 6,321,206), hereinafter referred to as Honarvar, in view of Herz, et al. (U.S. Patent No. 2001/0014868), hereinafter referred to as Herz and in further view of Boyd, et al. (U.S. Patent No. 7,072,848), hereinafter referred to as Boyd. Claims 35-36, 39-42, 46, and 52 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Honarvar, in view of Herz, in view of Boyd and in further view of Ulwick, et al. (U.S. Patent No. 6,115,691), hereinafter referred to as Ulwick. Applicants respectfully traverse these rejections based on the following discussion.

The claimed invention provides a method for dynamically developing a marketing strategy to address at least one specified merchant objective. In the rejection, the Office Action argues that the prior art of record discloses many features of the claimed invention. However, contrary to the position taken in the Office Action, the “desired outcomes” in Ulwick do not teach the “states” of the claimed invention. Specifically, the “desired outcomes” in Ulwick describe what is valued by consumers in order to obtain satisfaction, whereas the “states” of the claimed invention related to consumer purchase frequency and the monetary value of the purchases. Furthermore, Applicants submit that the “predictive metrics” (which the Office Action asserts teaches the “values” of the claimed invention) of the “desired outcomes” in Ulwick do not comprise a “total expected reward” for the “desired outcomes”. Instead, the “predictive metrics” of Ulwick

predict whether the “desired outcomes” will be achieved. The “predictive metrics” of Ulwick are unrelated to rewards for the “desired outcomes”.

In addition, Applicants submit that nothing within Ulwick teaches that the computing of the predictive metrics (which the Office Action asserts teaches the “computing” step of the claimed invention) and the selection of a mission (which the Office Action asserts teaches the “constructing” step of the claimed invention) are performed iteratively until a new improved policy remains unchanged for two subsequent iterations. Therefore, as explained in greater detail below, Applicants respectfully submit that the prior art of record does not teach or suggest the claimed invention.

Applicants traverse the rejections because the proposed combination of Honarvar, Herz, Boyd, and Ulwick fails to teach the claimed features of “computing the value of a state for said deterministic policy, wherein said value comprises a total expected reward for said state, [and] repeating said step of computing for all possible states” as defined in independent claims 29, 43, 49, 55, and 56.

The Office Action expressly acknowledges that such features are not taught in Honarvar, Herz, or Boyd (Office Action, p. 12, last para.). However, the Office Action asserts that such features are disclosed in Ulwick. More specifically, the Office Action asserts that the computing of the “predictive metrics” of the “desired outcomes” in Ulwick teaches the computing of the “values” of the “states” in the claimed invention (Office Action, p. 13, para. 1 (citing Ulwick, col. 6, lines 53-67 and col. 16, lines 17-30)). Applicants respectfully disagree.

First of all, contrary to the position taken in the Office Action, the “desired outcomes” in Ulwick do not teach the “states” of the claimed invention. The “desired outcomes” in Ulwick describe what is valued by consumers in order to obtain satisfaction, whereas the “states” of the claimed invention related to consumer purchase frequency and the monetary value of the purchases. More specifically, as defined in independent claims 29, 43, 49, 55, and 56, “said state of a customer comprises a purchase frequency and a monetary value of purchases”. As further described in paragraph 0028 of Applicants’ disclosure, a state is identified by a set of variables such as customer profile, purchase frequency, monetary value of purchases and any other quantifiable measure so that a customer at any event or at any decision epoch can be uniquely identified to belong to a state in the space, S, described by the above set of variables. A typical customer's purchase pattern over time defines a trajectory over this space.

To the contrary, the “desired outcomes” in Ulwick (which the Office Action asserts teaches the “states” of the claimed invention) are unrelated to purchase frequencies and monetary values of purchases. Instead, the “desired outcomes” in Ulwick describe what is valued by customers in order to obtain satisfaction.

Specifically, as described in column 9, lines 50-64 of Ulwick, the qualitative research establishes desired outcomes relating to the particular application (e.g. product development) perceived as valuable by a particular market segment; hence, the term "desired outcomes" is used herein to describe what is valued by a specific customer segment. A desired outcome is a benefit of value to a particular customer. It is what the customer requires to obtain satisfaction. It is a statement that defines what the customer

wants, why they want it, and how they perceive its satisfaction. A desired outcome is free from solutions or specifications. It is free from vague words such as "easy" or "comfortable," and is stable over time. The present invention contemplates the identification of a finite set of desired outcomes for a given application through statistically proven market research.

Furthermore, Applicants submit that the “predictive metrics” (which the Office Action asserts teaches the “values” of the claimed invention) of the “desired outcomes” (which the Office Action asserts teaches the “states” of the claimed invention) in Ulwick do not comprise a “total expected reward” for the “desired outcomes” (independent claims 29, 43, 49, 55, and 56 define that “said value comprises a total expected reward for said state”). Instead, the “predictive metrics” of Ulwick predict whether the “desired outcomes” will be achieved. The “predictive metrics” of Ulwick are unrelated to rewards for the “desired outcomes”.

Specifically, as described in column 6, lines 53-60 of Ulwick, advanced research establishes unique parameters that predict that the desired outcomes will be achieved. These parameters, called predictive metrics or predictive success factors, can be measured and controlled in the design of the solution. They predict with certainty that the desired outcomes will be achieved. One predictive metric exists for each desired outcome, however, each predictive metric may positively or negatively affect other desired outcomes. The “predictive metrics” of Ulwick are unrelated to rewards for the “desired outcomes”.

To the contrary, as described in paragraph 0033 of Applicants' disclosure, the value of a policy is a vector of total expected rewards. Each element of the vector corresponds to a state and represents the total expected reward for the policy for that state. As further described in paragraph 0035 of Applicants' disclosure, immediate rewards measure the monetary value of the customer activity or reactions to marketing strategy, between two successive decision epochs for a given state and for an executed action. These immediate rewards define the needed reinforcement signal and measure the immediate effect of the marketing decision. An immediate reinforcement (reward) measures only short-term effects, positive or negative. A myopically optimal strategy can have adverse effects in future. For instance, a promotional activity may lead to immediate rise in sales of a product but as a result demand over subsequent periods might drop since the customers might have stockpiled the product, during the period of promotion, for a later use. Significance value of an action measures the impact of the marketing action by weighing the immediate rewards against future revenues. This significance value of an action is constantly updated as learning progresses. The significance value is represented by $Q(s,a)$, which measures the overall reward expected by executing strategy "a" whenever "x" is encountered. Reinforcement learning algorithms therefore optimizes over Value of a Policy and not on immediate rewards.

Accordingly, Applicants submit that, contrary to the position taken in the Office Action, the "desired outcomes" in Ulwick do not teach the "states" of the claimed invention. Specifically, the "desired outcomes" in Ulwick describe what is valued by consumers in order to obtain satisfaction, whereas the "states" of the claimed invention

related to consumer purchase frequency and the monetary value of the purchases.

Furthermore, Applicants submit that the “predictive metrics” (which the Office Action asserts teaches the “values” of the claimed invention) of the “desired outcomes” in Ulwick do not comprise a “total expected reward” for the “desired outcomes”. Instead, the “predictive metrics” of Ulwick predict whether the “desired outcomes” will be achieved. The “predictive metrics” of Ulwick are unrelated to rewards for the “desired outcomes”. Therefore, it is Applicants’ position that the prior art of record fails to teach the claimed features of “computing the value of a state for said deterministic policy, wherein said value comprises a total expected reward for said state, [and] repeating said step of computing for all possible states” as defined in independent claims 29, 43, 49, 55, and 56.

In addition, Applicants traverse the rejections because the proposed combination of Honarvar, Herz, Boyd, and Ulwick fails to teach the claimed features of “iteratively performing said steps of computing, repeating, and constructing until a new improved policy remains unchanged for two subsequent iterations” as defined in independent claims 29, 43, 49, 55, and 56.

The Office Action expressly acknowledges that such features are not taught in Honarvar, Herz, or Boyd (Office Action, p. 12, last para.). However, the Office Action asserts that such features are disclosed in Ulwick. More specifically, the Office Action asserts that the computing of the predictive metrics and the selection of a mission teach the “computing” and “constructing” steps, respectively, of the claimed invention (Office Action, p. 12, last para. – p. 13, first para.).

However, nothing within Ulwick teaches that the computing of the predictive metrics and the selection of a mission are performed iteratively until a new improved policy remains unchanged for two subsequent iterations (independent claims 29, 43, 49, 55, and 56). Instead, Ulwick only discloses repeating one process, i.e., the process in “block 212” (Ulwick, col. 23, lines 12-13). Specifically, Ulwick repeats the process of evaluating each of the documented solutions against the prioritized predictive metrics to determine how much value will be created by each solution (Ulwick, col. 22, line 62 – col. 23, line 13). However, Ulwick fails to disclose iteratively repeating “block 212” until a predetermined condition is satisfied.

Accordingly, Applicants submit that nothing within Ulwick teaches that the computing of the predictive metrics (which the Office Action asserts teaches the “computing” step of the claimed invention) and the selection of a mission (which the Office Action asserts teaches the “constructing” step of the claimed invention) are performed iteratively until a new improved policy remains unchanged for two subsequent iterations. Therefore, it is Applicant’s position that the prior art of record fails to teach the claimed features of “iteratively performing said steps of computing, repeating, and constructing until a new improved policy remains unchanged for two subsequent iterations” as defined in independent claims 29, 43, 49, 55, and 56.

Further, it is Applicants’ position that dependent claims 30-33, 36-42, 44-45, 47-48, 50-51, and 53-54 are similarly patentable, not only because of their dependency from a patentable independent claims, but also because of the additional features of the

invention they defined. In view of the foregoing, the Examiner is respectfully requested to reconsider and withdraw the rejections.

IV. Formal Matters and Conclusion

In view of the foregoing, Applicants submit that claims 29-33, 36-45, 47-51, and 53-56, all the claims presently pending in the application, are patentably distinct from the prior art of record and are in condition for allowance. The Examiner is respectfully requested to pass the above application to issue at the earliest possible time.

Should the Examiner find the application to be other than in condition for allowance, the Examiner is requested to contact the undersigned at the local telephone number listed below to discuss any other changes deemed necessary. Please charge any deficiencies and credit any overpayments to Attorney's Deposit Account Number 09-0441.

Respectfully submitted,

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